FROM Continental contemporaries we note the following recent appointments:—Prof. H. Rubens, professor of physics at the Technical High School, Berlin, to be professor of physics at the University of Berlin and director of the Physical Institute; Prof. Arthur Wehnelt, professor of theoretical and applied physics of the University of Erlangen, to be a professor and departmental director in the University of Berlin; Dr. Joseph Grünwald, privatdocent at the University and the Technical High School of Vienna, to be extraordinary professor of mathematics in the University of Prague; Dr. H. Mache, privatdocent of the Vienna University, to be extraordinary professor of physics in the University of Innsbruck; Prof. Cæsar Pomeranz, extraordinary professor of chemistry in the Vienna University, to be professor of chemistry in the University of Czernowitz; Prof. Karl Zsigmondy, professor of mathematics in the Technical High School, Prague, to the chair of mathematics in the Technical High School, Vienna; Prof. Reissner, privatdocent in the Technical High School, Berlin, to be professor of mechanics in the Technical High School, Aachen; Prof. Zdenko Skraup, professor of chemistry in the University of Graz, to the chair of chemistry in the University of Vienna; Prof. Franz Streintz, privatdocent of the University of Graz, to be professor of physics of the Technical High School in Graz.

## *SOCIETIES AND ACADEMIES.*

### LONDON.

**Royal Society,** May 31.—"The Viscosity of the Blood." By Dr. A. du Pré **Denning** and John H. **Watson.** Communicated by Prof. F. Gotch, F.R.S.

It is urged that the full import of a knowledge of the variations in the viscous resistance to be overcome by the blood in circulating through the capillaries and smaller vessels of the system, and the significance of such data to the more exact consideration of a large number of normal and pathological conditions, especially those of the circulatory system, have not been fully realised by either clinicians or physiologists. Experiments have been undertaken to observe the influence of the number of the corpuscles present upon the viscosity of the blood under varying conditions of pressure and temperature, the rate of flow through capillaries of different sizes under the same conditions, and the alterations caused by the additions of certain salts and other substances; one important result of the experiments was to show that the decrease in viscosity for each degree rise of temperature for a blood rich in corpuscles is considerably greater than for a blood poor in corpuscles, especially when the flow is through the finer capillaries, or, in other words, the flow of blood does not follow the fourth power of the radius as required by the Poiseuille formula. An attempt is made to indicate briefly the import of the results obtained in a consideration of the mechanism of the circulatory system. At the end of the paper an account is given of a clinical viscosimeter which the authors have devised for determinations of blood viscosities with but a few drops of blood; such viscosity determinations, it is claimed, are necessary supplements to hæmacytometer observations.

June 21.—"On the Behaviour of Certain Substances at their Critical Temperatures." By Dr. Morris W. **Travers,** F.R.S., and Francis L. **Usher.**

Traube, de Heen, and others have recently suggested that the simple theories of Andrews and Van der Waals may be insufficient to account for the changes which take place in pure substances at their critical temperatures. Their evidence appears to show that in the case of such substances as ethyl alcohol and ether the Cagniard-Latour temperature is dependent on the relative volumes of the two phases, and to account for this they have suggested the existence in the system of complex molecules.

The authors have carried out investigations with ether and with sulphur dioxide, and have found that the Cagniard-Latour temperature is independent of the conditions under which the experiments are carried out. Particular precautions were taken to obtain the liquids pure and to maintain steady temperatures, the measurements of which were certainly accurate to within 0°·05.

The second part of the paper deals with the phenomenon of opalescence which is observed in pure liquids at their critical temperatures. If varying quantities of a pure liquid are heated in sealed glass tubes, provided that the liquid neither disappears nor completely fills the tube before the critical temperature is reached, the surface separating the two phases may sink and disappear near the bottom of the tube, or it may remain stationary about the middle of the tube, or, lastly, it may rise and vanish near the top. In all three cases, if the temperature is raised so slowly that equilibrium is attained without ebullition of the liquid phase, the contents of the tube become opalescent at a temperature slightly below that at which the surface vanishes, the effect being similar to that produced by the action of oxidising agents on a solution of sulphuretted hydrogen. When the surface is falling the opalescence appears in the space below it, and when the surface is rising, in the space above it. In either case the opalescence is confined to the space in which it first appeared by the moving surface, and its intensity is inversely proportional to the volume it occupies. Although it is fairly evenly distributed through the space it occupies, it is usually more intense very near to the surface, and when the latter disappears gradually becomes diffused through the whole tube.

In the case where the surface appears to remain stationary, the tube appears slightly and evenly opalescent throughout its whole length, and if, when this is the case, the volume of the space containing the substance is increased or decreased, opalescence appears below or above the surface itself, and its intensity is inversely proportional to the space it occupies. The effect persists over a finite range of temperature. In the case of sulphur dioxide it sets in at 0°·1 below that at which the surface vanishes, attains a maximum at about 0°·05 above it, and completely disappears at a temperature 0°·1 higher. In the case of ether the effect persists over about 2°.

The conditions necessary for the existence of complexes in a liquid-vapour one-component system in the neighbourhood of the critical temperature were given by Donnan at the British Association in 1904. He suggested that at the critical temperature the interfacial tension becomes zero for ordinary values of the radius of curvature, but remains positive for very small values, for which it does not become zero until the critical temperature is passed. Hence it may be assumed that at temperatures slightly below the critical the interfacial tension is greater for very small radii of curvature than for ordinary curvatures. If over a range of temperature, including the critical temperature, limited above by the temperature at which the interfacial tension for very small curvatures becomes zero, and below less sharply, small non-molecular aggregates can be formed, it follows that these will be differentiated from either the liquid or vapour phase, and will have a stable existence. To such aggregates is attributed the phenomenon of opalescence, and the range of temperature over which it is observed, and the manner of its appearance and disappearance, are in agreement with the assumptions.

### PARIS.

**Academy of Sciences,** October 29.—M. H. Poincaré in the chair.—A new and rapid method for the determination of the errors of division of a meridian circle: M. **Lœwy.** A more detailed discussion of a method described in outline in an earlier paper.—The moth of the beetroot, *Lita ocellatella*: Alfred **Giard.** The author has recognised by a further study of this parasite that he was in error in identifying it as belonging to the species *Loxostege sticticalis* of American naturalists, or *Phlyctoenodes* or *Eurycreon sticticalis*, according to the European nomenclature. The author points out the remarkable facility with which the larvæ escape through small apertures, and the danger through this cause of sending live specimens through a district not subject to this pest.—Observations on the sun made at the Observatory of Lyons during the third quarter of 1906: J. **Guillaume.** The results are summarised in three tables, giving the surfaces of the sun-spots, their distribution in latitude, and the distribution of the faculæ in latitude.—The deformation of quadrics: Luigi **Bianchi.**—The transformations of some linear partial differential equations of the second order:

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J. **Clairin.**—The system of integrals of total differentials belonging to a hyperelliptic surface: E. **Traynard.**—The complementary geodesic triangulations of the higher regions of the French Alps: P **Helbronner.**—The velocities of detonation of explosives: M. **Dautriche.** The author describes a new method of measuring these velocities by the use of an explosive string. The two ends of this are fired simultaneously by a detonator, and the point at which the two detonations meet determined by a special device. After the accuracy of the method had been determined by blank experiments, in which both arms of the circuit consisted of the same material, a tube containing another explosive was inserted in one of the arms. It was found possible to measure the retardation to one hundred-thousandth of a second.—Stereoscopic relief by projection: E. **Estanave.**—The dissociation of matter under the influence of light and heat: Gustave **Le Bon.** Remarks on a recent paper by Sir W. Ramsay and J. Spencer.—The migration of the phenyl group: mode of fixation of hypoiodous acid and of the elimination of hydriodic acid: M. **Tiffeneau.** In the fixation of HIO the hydroxyl group attaches itself by preference to the carbon atom to which the greatest number of groups are fixed, and to that nearest the phenyl group. In the elimination of HI the hydroxyl group nearest the phenyl group remains unattacked, and there is a migration of the phenyl. If, on the contrary, the hydroxyl group is removed from the phenyl group, the elimination of HI tends to form ethylene oxides.—Some new observations made at the summit of Mt. Blanc on the effect of high altitudes on the blood corpuscles: H. **Guillemard** and R. **Moog.**—The coagulability of the subhepatic blood: MM. **Doyon,** Cl. **Gautier,** and N. **Kareff.** Contrary to the usually accepted views, the authors, from experiments on more than fifty dogs, conclude that the subhepatic blood does coagulate, and also contains fibrin.—The lakes of the ring of Rabuons, Maritime Alps: André **Delebecque.** An account of hydrographic researches done on these lakes during the summer of 1906.

## DIARY OF SOCIETIES.

### *THURSDAY*, NOVEMBER 8.

ROYAL SOCIETY, at 4.30.—The Occurrence of Encystation in *Trypanosoma grayi* (Novy); with Remarks on Methods of Infection in Trypanosomes generally: Prof. E. A. Minchin.—Note on the Continuous Rays observed in the Spark Spectra of Metalloids and some Metals: Prof. W. N. Hartley, F.R.S.—The Composition of Thorianite, and the Relative Radio-activity of its Constituents: Dr. E. H. Büchner.—A Numerical Examination of the Optical Properties of Thin Metallic Plates: Prof. R. C Maclaurin.—On a Compensated Micro-manometer: B. J. P. Roberts.—Experimental Investigation as to the Dependence of Gravity on Temperature: L. Southerns

MATHEMATICAL SOCIETY, at 5.30.—Annual General Meeting.—Presidential Address: Partial Differential Equations; some Criticisms and some Suggestions: Prof. A. R. Forsyth —Harmonic Expansions of Functions of Two Variables: Prof. A. C. Dixon.—The General Solution of Laplace's Equation in $n$ Dimensions: G. N. Watson.—On Sub-groups of a Finite Abelian Group: H. Hilton.—On Bäcklund's Transformation and the Partial Differential Equation $s=F(x, y, z)$.—On the Inversion of a Definite Integral: H. Bateman.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Presentation of Premiums awarded for Papers Read or Published during 1905–06.—Inaugural Address by the President, Dr. R. T. Glazebrook, F.R S.

### *FRIDAY*, NOVEMBER 9.

ROYAL ASTRONOMICAL SOCIETY, at 5.—On the Effects of Radiation on the Motion of Comets (Second Note): H. C. Plummer.—(1) On the Early Eclipses; (2) The Early Eclipses of the Sun and Moon: E. Nevill.—Note on a Mechanical Solution of Kepler's Equation: H. C. Plummer.—On the Possibility of Improving the Places of the Reference Stars for the Astrographic Catalogue from the Photographic Measures: H. H. Turner. The Systematic Motions of the Stars: A. S. Eddington —Stellar Parallax Papers, No. 3, The Parallax of Eight Stars, from Photographs taken at the Cambridge Observatory: H. N. Russell.—Auroræ observed at Delting, Shetland, 1905–6: Rev. A. C. Henderson.—*Probable Papers:* Solar Parallax Papers, No. 5, Examination of the Photographic Places of Stars published in the Paris *Eros* Circular: A. R. Hinks.—Notes on Theoretical Spectroscopy: E. T. Whittaker.

PHYSICAL SOCIETY, at 8.—Exhibition and Description of Experiments Suitable for Students in a Physics Laboratory: G. F. C. Searle.

MALACOLOGICAL SOCIETY, at 8.—Description of a New Species of Calliostoma from S. Formosa: E. A. Smith, I.S.O.—Description of a New Sub-genus and Species of Alycæus from Ke-lan-tan: H. B. Preston.—Description of Six New Species of Shells and of *Leptomya lintea*, Hutton, from New Zealand: H. Suter.—Descriptions of some Tertiary Shells from New Zealand: H. Suter.

### *MONDAY*, NOVEMBER 12.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—North-Eastern Rhodesia: L. A. Wallace.

### *TUESDAY*, NOVEMBER 13.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Single-phase Electric Traction: C. F. Jenkin

ZOOLOGICAL SOCIETY, at 8.30.—On the Embryo of the Okapi: Prof. R. Burckhardt.—Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904–05. Report on the Turbellaria: F. F. Laidlaw.—List of Further Collections of Mammals from Western Australia, including a Series from Bernier Island, obtained for Mr. W. E. Balston: with Field-notes by the Collector, Mr. G. C. Shortridge: Oldfield Thomas, F.R.S.—The Mollusca of the Persian Gulf, Gulf of Oman, and Arabian Sea, as evidenced mainly through the Collections of Mr. F. W. Townsend, 1893–1905; with Descriptions of New Species, Part ii., Pelecypoda: J. Cosmo Melvill and Robert Standen.

MINERALOGICAL SOCIETY, at 8.—Growth of Crystals of Soluble Salts on Each Other: T. V. Barker.—Notes on Some Bolivian Minerals: L. J. Spencer.—Note on Ilmenite from Brazil: G. F. Herbert Smith.—Description of the Lengenbach Quarry and of the Minerals found there in 1906: R. H. Solly.—Note on the Thirty-two Classes of Symmetry: H. Hilton.—Note on a Canadian Mineral: Prof. Harrington.

FARADAY SOCIETY, at 8.—Some Investigations Relative to the Depreciation of Electrolytically-produced Solutions of Sodium Hypochlorite: W. Pollard Digby —The Hermite Electrolytic Process at Poplar: C. V. Biggs.—On the Electrochemistry of Lead: Dr. A. C. C. Cumming.

### *THURSDAY*, NOVEMBER 15.

ROYAL SOCIETY, at 4.30.—*Probable Papers:* Calcium as an Absorbent of Gases, and its Applications in the Production of High Vacua and for Spectroscopic Research: F. Soddy.—A Method of Gauging by Evaporation the Degree of High Vacua: A. J. Berry.—The Effect of Temperature on the Activity of Radium and its Transformation Products: Dr. H. L. Bronson.—On the Refractive Indices of Gaseous Potassium, Zinc, Cadmium, Mercury, Arsenic, Selenium and Tellurium: C. Cuthbertson and E. P. Metcalfe.—The Photo-electric Fatigue of Zinc: H. S Allen.

CHEMICAL SOCIETY, at 8.30.—On the Determination of the Rate of Chemical Change by Measurement of Gases Evolved: F. E. E. Lamplough.—Xanthoxalanil and its Analogues: S. Ruhemann.

LINNEAN SOCIETY, at 8.—Recent Researches in Norway: Horace W Monckton.

### *FRIDAY*, NOVEMBER 16.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Steam as a Motive Power for Public Service Vehicles: T. Clarkson.

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